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Chang et al.

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(54) **SLIDING-DOOR HANDLE DEVICE**

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CPC ***E05B 1/0015*** (2013.01); *E05B 65/08* (2013.01); *Y10T 16/458* (2015.01)

(58) **Field of Classification Search**
CPC E05B 1/0015; E05B 1/00; E05B 1/0053; E05B 1/0069; E05B 1/04; E05B 1/06; E06B 3/4681; Y10T 16/458; Y10T 16/459; Y10T 16/469
USPC 16/412, 422, 404, 413, 414
See application file for complete search history.

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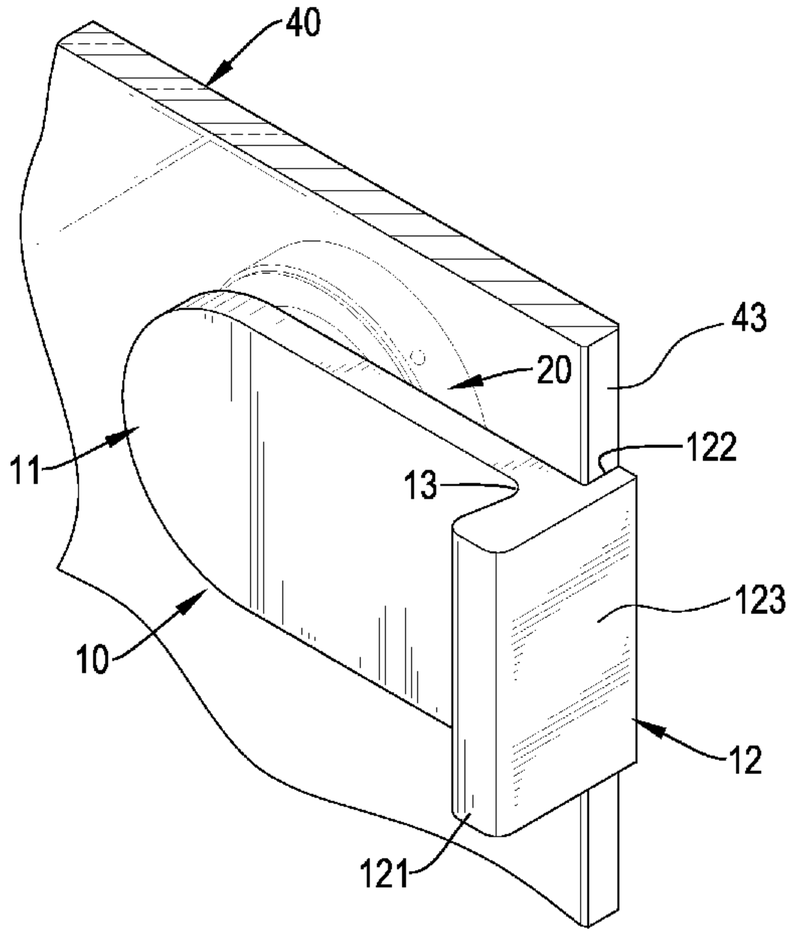
(57) **ABSTRACT**

A sliding-door handle device has an outside handle and an inside handle. The outside handle is mounted on and abuts the sliding door and has a connecting board and a pulling tab. The connecting board is shaped as an elongated strip and abuts an outer side of the sliding door. The pulling tab is formed on and protrudes perpendicularly from a front end of the connecting board such that the outside handle is formed in a T shape. The pulling tab has a pulling end and a pressing end. The inside handle is detachably connected to the outside handle via the sliding door to connect the outside handle with the sliding door and has an assembling mount.

4 Claims, 8 Drawing Sheets



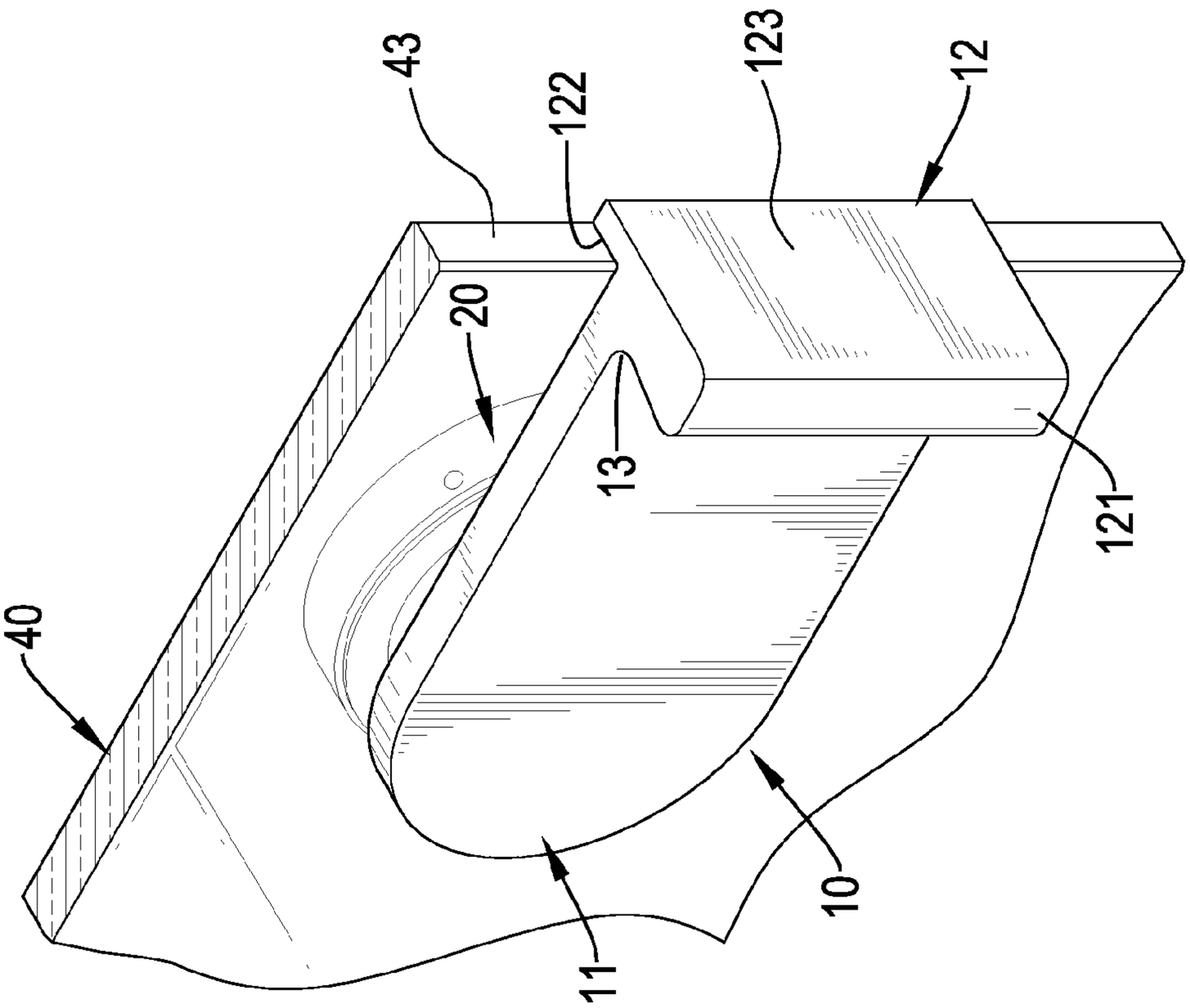


FIG.1

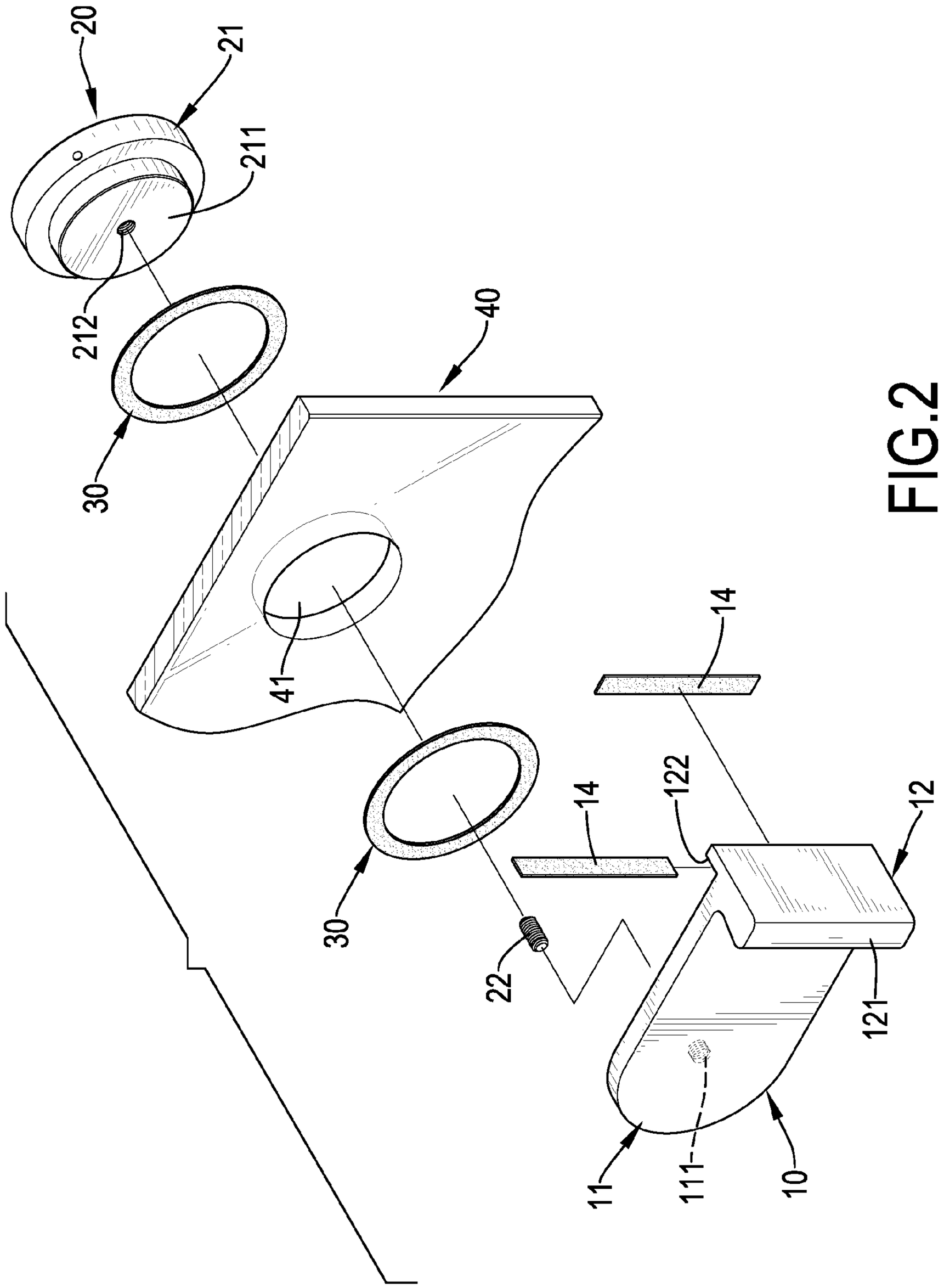


FIG.2

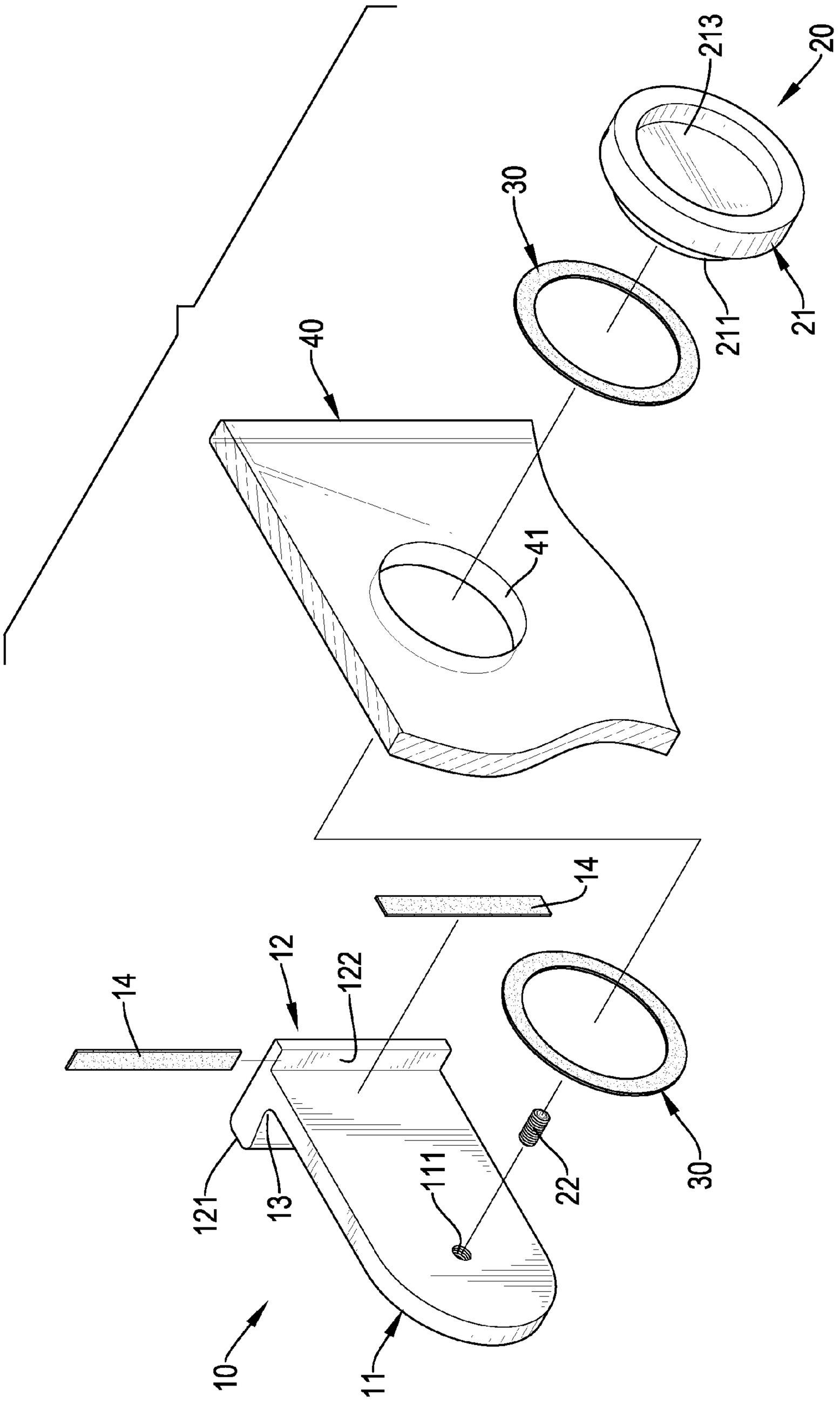


FIG.3

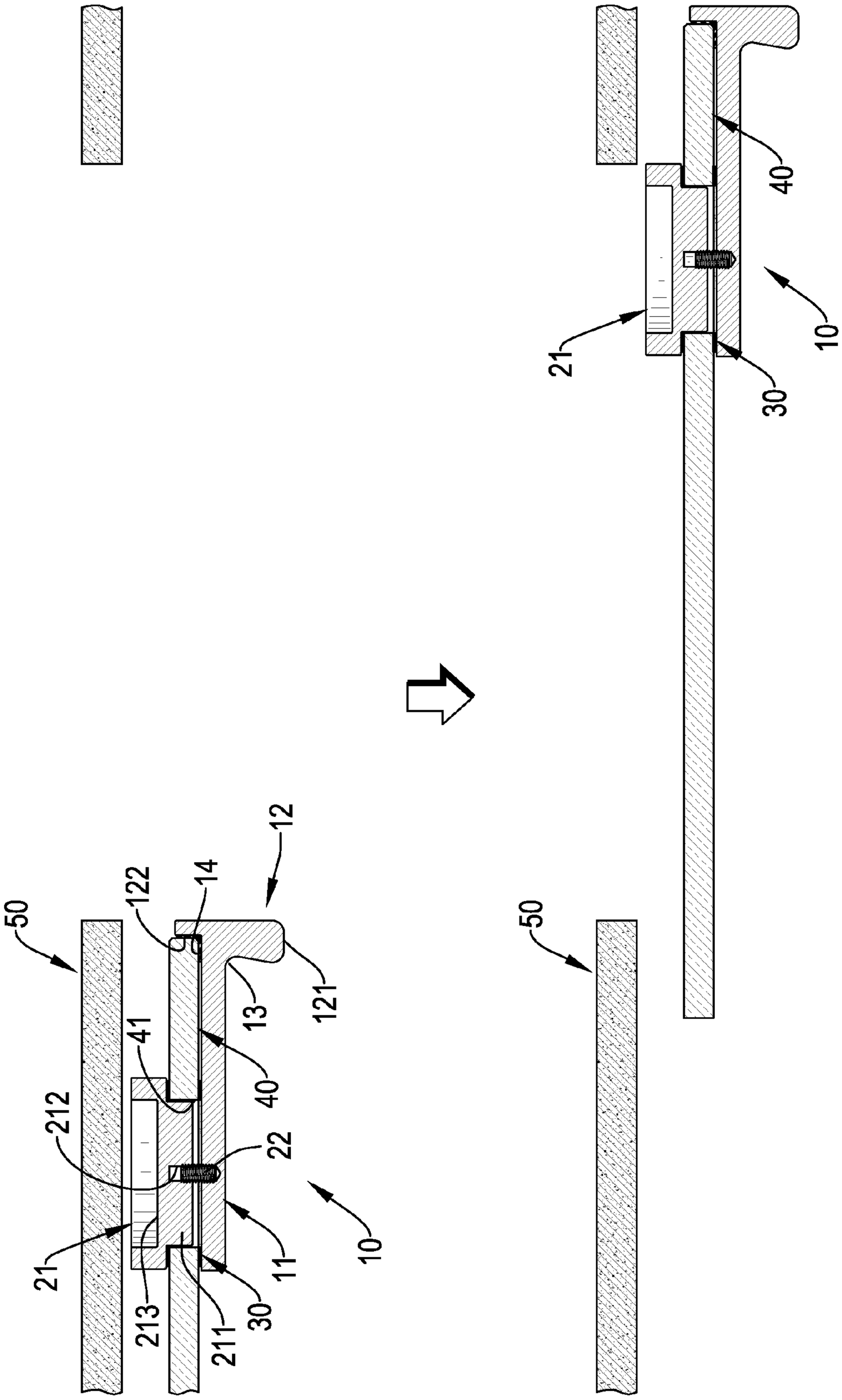
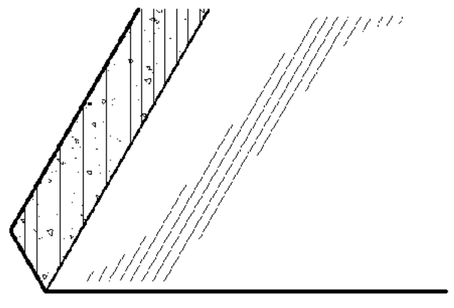


FIG.4



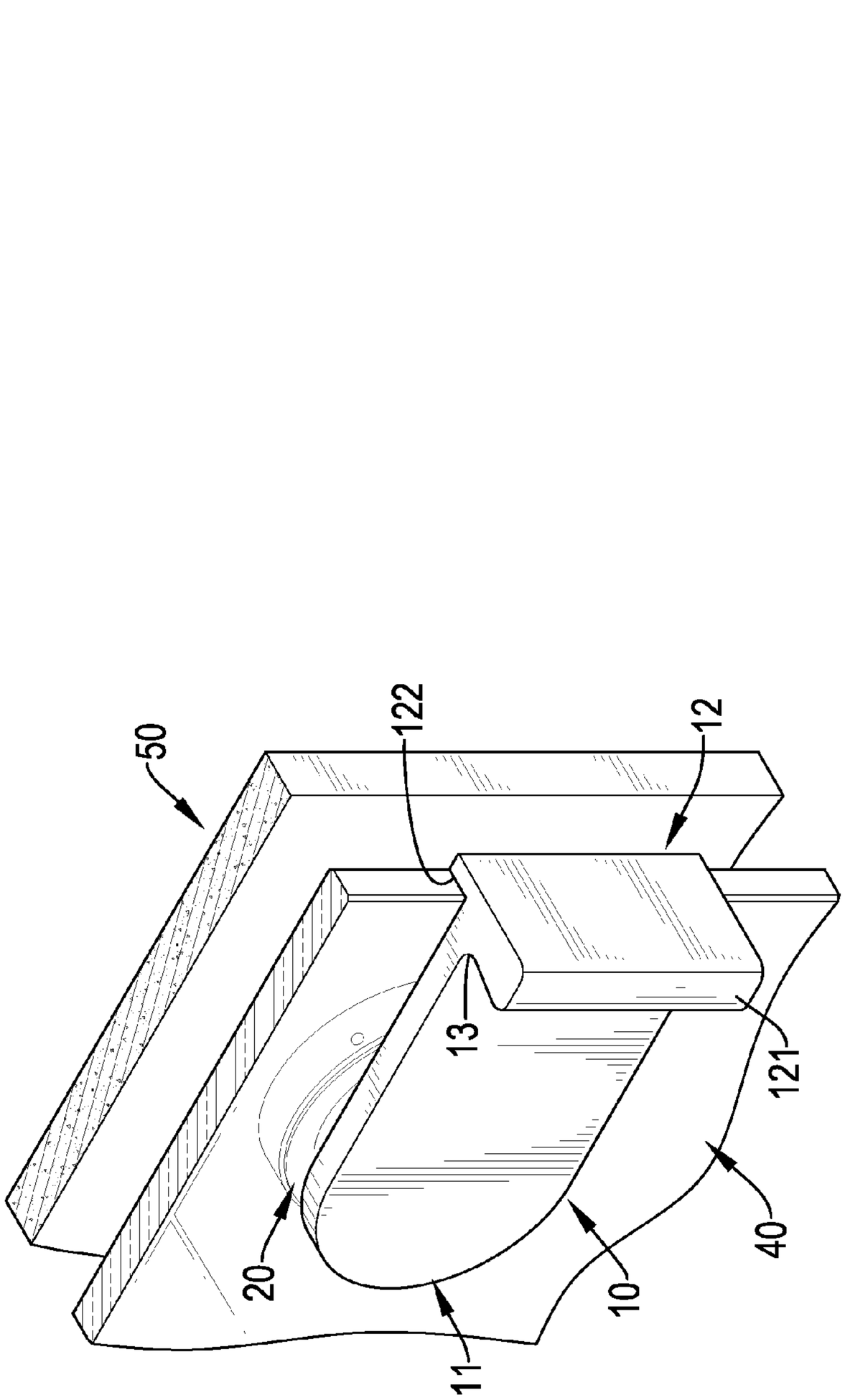


FIG.5

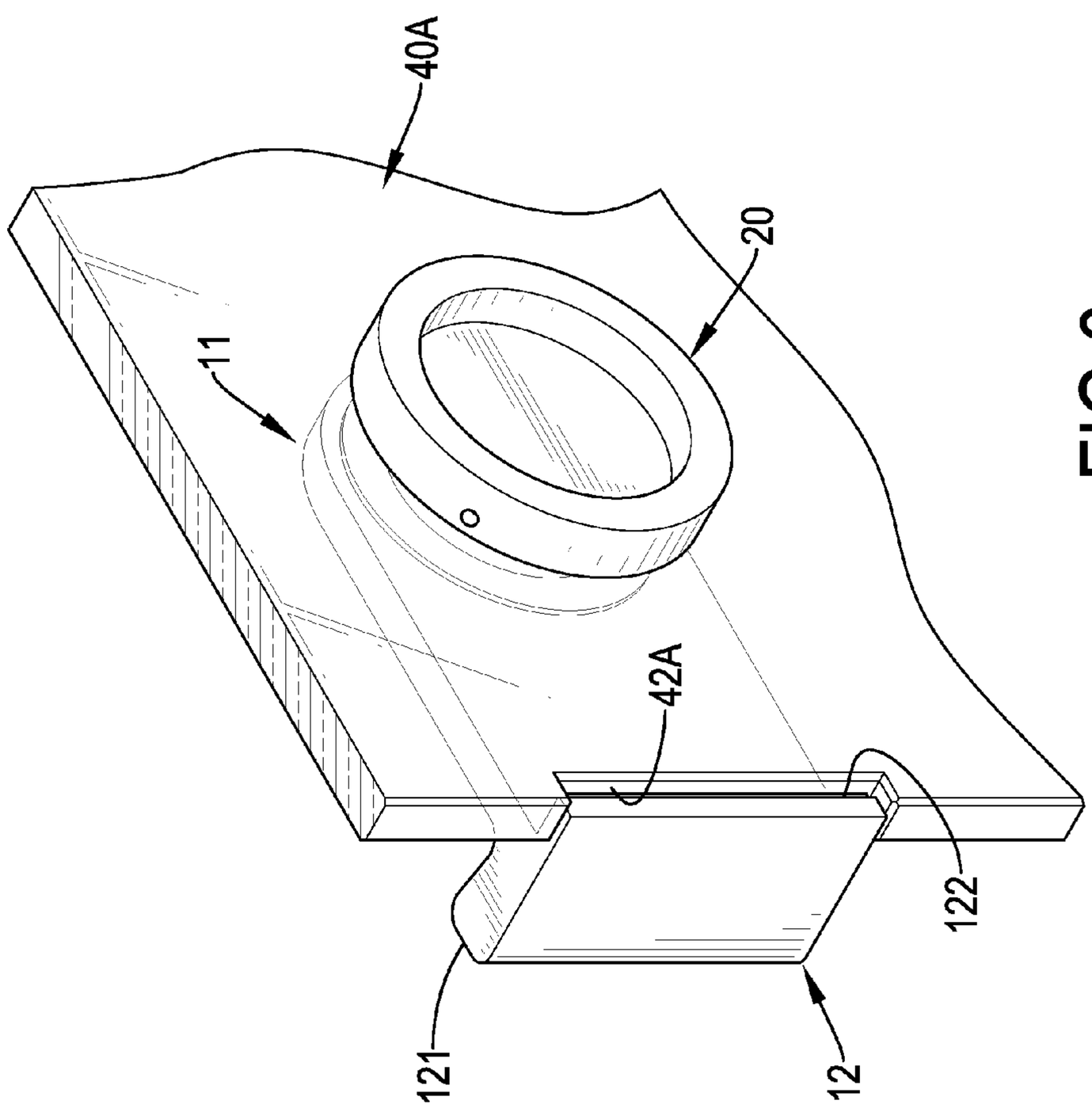


FIG.6

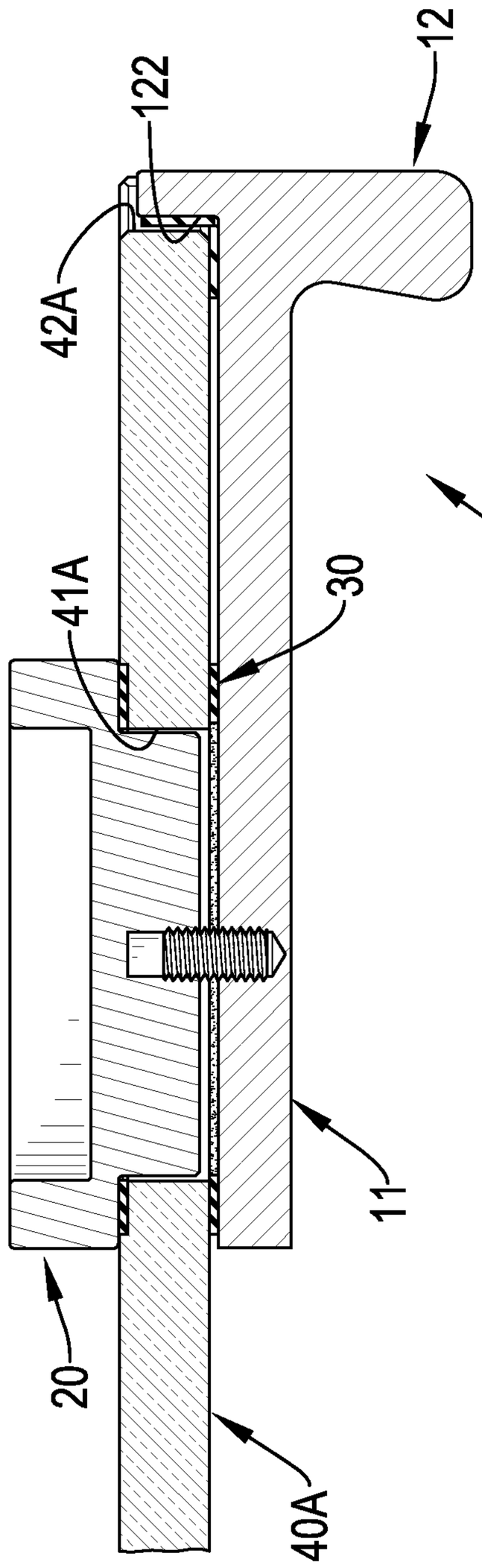


FIG.7

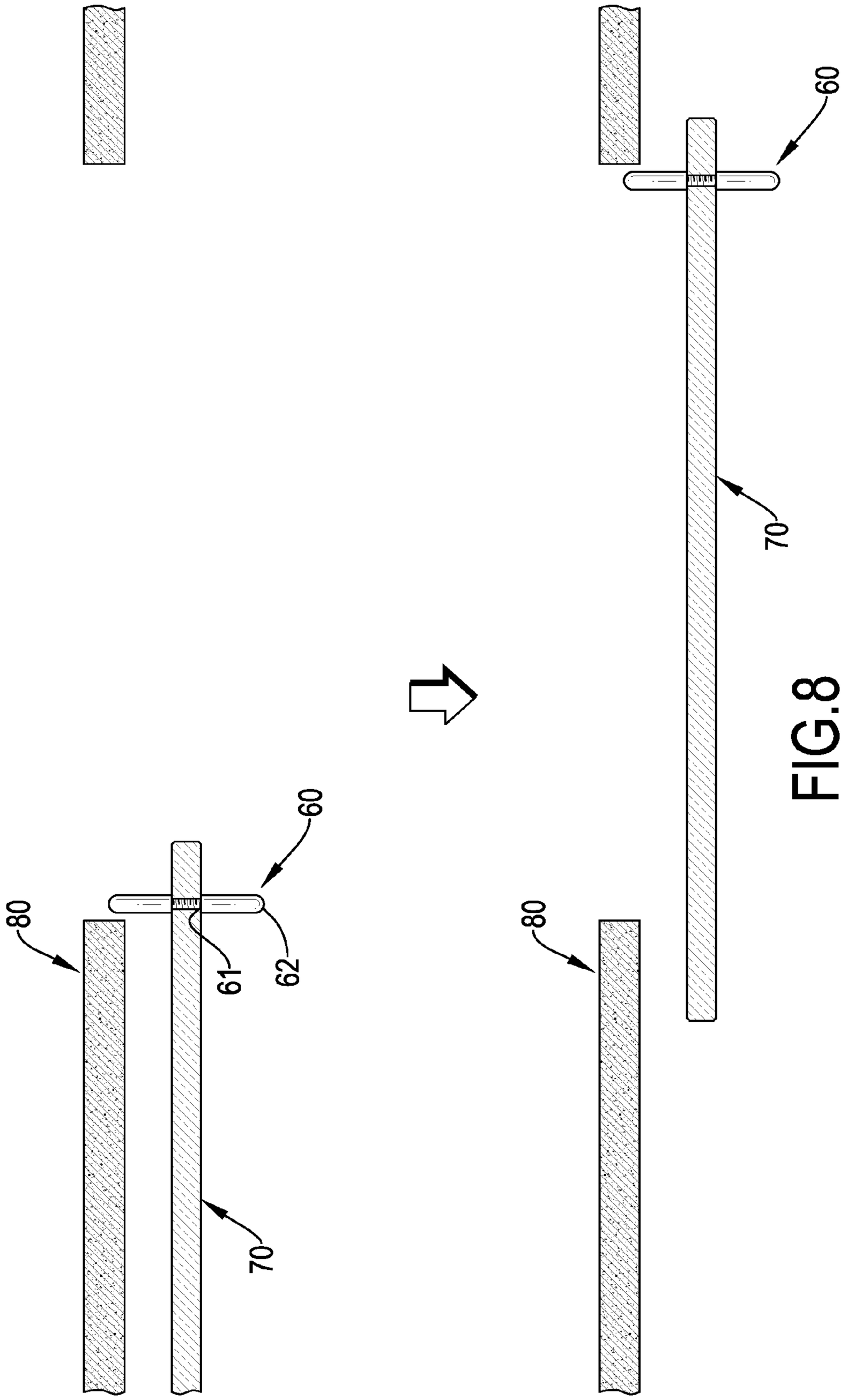


FIG.8
PRIOR ART

SLIDING-DOOR HANDLE DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a sliding-door handle device, and more particularly relates to a sliding-door handle device that can enable a sliding door to align with a wall, so as to provide a wider passage for the user to pass through and to pull the sliding door conveniently.

2. Description of Related Art

With reference to FIG. **8**, a conventional sliding door **70** (such as a glass door) with an inner side and an outer side is movably mounted on a side of a wall **80** by a rail assembly. A passage is formed between the wall and the sliding door **70** to enable the user to pass through. The conventional sliding door **70** can be moved horizontally relative to the wall **80** to open or close the passage. When the conventional sliding door **70** is moved toward the wall **80**, the inner side of the conventional sliding door **70** faces to the wall **80**. In order to allow users to easily push the conventional sliding door **70**, two handles **60** are made U-shaped and are respectively mounted on the inner side and the outer side of the conventional sliding door **70**. Each one of the handles **60** has two free ends **61** and a middle segment **62**. The free ends **61** of the handle **60** are securely mounted on the conventional sliding door **70**. The middle segment **62** is formed with the free ends **61** of the handle **60** and protrudes from the inner side or the outer side of the conventional sliding door **70** for the users to grip the handle **60**.

The handles **60** that are securely mounted on the conventional sliding door **70** can enable the users to push the conventional sliding door **70** to move relative to the wall **80** easily. When the conventional sliding door **70** is moved toward the wall **80** by pushing the handles **60**, the middle segment **62** of the handle **60** that is mounted on the inner side of the conventional sliding door **70** extends out of the inner side of the conventional sliding door **70** may hit a front edge of the wall **80**. In order to prevent the handle **60** from hitting the front edge of the wall **80**, a rear edge of the conventional sliding door **70** cannot align with a rear edge of the wall **80** and this will limit the width of the passage between the wall **80** and the sliding door **70**.

The user can assemble only one of the handles **60** on the outer side of the sliding door **70** without assembling the other handle **60** on the inner side of the sliding door **70**. Since there is no inference between the inner side of the sliding door **70** and the wall **80**, the rear edge of the conventional sliding door **70** can align with the rear side of the wall **80** to provide a wider passage. When the rear edge of the conventional sliding door **70** aligns with the rear side of the wall **80** and the user standing on the side of the wall **80** opposite to the outer side of the conventional sliding door **70** wants to close the conventional sliding door **70**, the user needs to move to the outer side of the conventional sliding door **70** to grip the handle **60** to move the conventional sliding door **70** relative to the wall **80** since the handle **60** is mounted only on the outer side of the conventional sliding door **70**. This is inconvenient in use.

Consequently, when the conventional sliding door **70** has two handles **60** respectively mounted on the sides of the conventional sliding door **70**, the rear edge of the conventional sliding door **70** cannot align with the rear edge of the wall **80**. When the conventional sliding door **70** only has one handle **60** mounted on the outer side of the conventional sliding door **70**, the user that stands on the side of the wall **80** cannot close the conventional sliding door **70** conveniently.

To overcome the shortcomings, the present invention provides a sliding-door handle device to mitigate the aforementioned problems.

SUMMARY OF THE INVENTION

The main objective of the present invention is to provide a sliding-door handle device that can enable the sliding door to align with a wall to provide a wider passage for the user to pass through and to pull the sliding door conveniently.

The sliding-door handle device in accordance with the present invention has an outside handle and inside handle. The outside handle is mounted on and abuts the sliding door and has a connecting board and a pulling tab. The connecting board is shaped as an elongated strip and abuts an outer side of the sliding door. The pulling tab is formed on and protrudes perpendicularly from a front end of the connecting board to form the outside handle in a T shape, and the pulling tab has a pulling end and a pressing end. The inside handle is detachably connected to the outside handle via the sliding door to connect the outside handle with the sliding door and has an assembling mount.

Other objectives, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a first embodiment of a sliding-door handle device in accordance with the present invention, assembled on a single-open sliding door;

FIG. **2** is an exploded perspective view of the sliding-door handle device in FIG. **1**;

FIG. **3** is another exploded perspective view of the sliding-door handle device in FIG. **1**;

FIG. **4** is operational top views of the sliding-door handle device in FIG. **1** showing the handle device respectively in a closed state and an open state;

FIG. **5** is an operational perspective view of the sliding-door handle device in FIG. **1** in an open state;

FIG. **6** is a perspective view of a second embodiment of a sliding-door handle device in accordance with the present invention, assembled on a double-open sliding door;

FIG. **7** is a cross sectional top view in partial section of the handle device in FIG. **6**; and

FIG. **8** is operational top views of a sliding-door handle device in accordance with the prior art showing the handle device respectively in a closed state and an open state.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIGS. **1** to **3**, a first embodiment of a sliding-door handle device in accordance with the present invention for a sliding door **40** (a single-open sliding door) having a front edge **43**, a rear edge, an inner side, an outer side and a through hole **41** formed through the sliding door **40** near the front edge of the sliding door **40**, and the handle device comprises an outside handle **10**, an inside handle **20** and multiple washers **30**.

The outside handle **10** is mounted on and abuts the outer side of the sliding door **40** and has a connecting board **11**, a pulling tab **12**, a hooking groove **13** and multiple mats **14**.

The connecting board **11** may be shaped as an elongated strip, abuts the outer side of the sliding door **40**, and has an inner side, an outer side, a rear end, a front end and a fixing

hole **111**. The inner side of the connecting board **11** abuts the outer side of the sliding door **40**. The front end of the connecting board **11** extends to the front edge of the sliding door **40**. The fixing hole **111** is formed in the inner side of the connecting board **11** near the rear end of the connecting board **11** and aligns with the through hole **41** of the sliding door **40**.

The pulling tab **12** is formed on and protrudes perpendicularly from the front end of the connecting board **11** such that the outside handle **10** is formed in a T shape. The pulling tab **12** has a pulling end **121** and a pressing end **122**. The pulling end **121** of the pulling tab **12** is formed on, protrudes from and extends out of the outer side of the connecting board **11**. The pressing end **122** of the pulling tab **12** is formed with the pulling end **121** of the pulling tab **12**, is formed on and protrudes from the inner side of the connecting board **11** and abuts the front edge of the sliding door **40**. Front ends of the pulling end and the pressing end define an upright front side surface **123**. When a user hooks the pulling end **121** of the pulling tab **12** to move the sliding door **40**, the pressing end **122** abuts against the front edge of the sliding door **40** to provide an abutment-support effect to the pulling tab **12**.

With reference to FIG. **4**, the hooking groove **13** is circular and is formed between the outer side of the connecting board **11** and the pulling end **121** of the pulling tab **12** for a user to hook the pulling end **121**.

The mats **14** are mounted between the connecting board **11**, the pressing end **122** of the pulling tab **12**, and the sliding door **40**.

With further reference to FIGS. **2** and **4**, the inside handle **20** is detachably connected to the outside handle **10** via the through hole **41** of the sliding door **40** to connect the outside handle **10** with the sliding door **40**, is securely mounted on and abuts the inner side of the sliding door **40** and has an assembling mount **21** and a bolt **22**.

The assembling mount **21** has an inner side, an outer side, a mounting block **211** and a recess **213**. The inner side of the assembling mount **21** abuts the inner side of the sliding door **40**. The outer side of the assembling mount **21** extends out of the through hole **41** of the sliding door **40**.

The mounting block **211** is formed on and protrudes from the inner side of the assembling mount **21**, is mounted in and corresponding to the through hole **41** of the sliding door **40** to face the connecting board **11**, and has a center and a threaded hole **212**. The threaded hole **212** is formed in the center of the mounting block **211** and aligns with the fixing hole **111** of the connecting board **11** via the through hole **41** of the sliding door **40**. The recess **213** is formed in the outer side of the assembling mount **21**. The bolt **22** is mounted in the threaded hole **212** of the mounting block **211** and the fixing hole **111** of the connecting board **11** via the through hole **41** of the sliding door **40** to connect the outside handle **10** and the inside handle **20** with the sliding door **40**.

The washers **30** are mounted between the outside handle **10**, the inside handle **20**, and the through hole **41** of the sliding door **40**.

With reference to FIGS. **6** and **7**, a second embodiment of a handle device in accordance with the present invention for a sliding door **40**A (a double-open sliding door) having a front edge, a rear edge, an inner side, an outer side, a through hole **41**A formed through the sliding door **40**A near the front edge of the sliding door **40**A, and a mounting recess **42**A formed in the front edge of the sliding door **40**A with a bottom face. The second embodiment of the handle device has similar structures substantially same as the structures in the above-mentioned first embodiment of the handle device except that the pressing end **122** of the pulling tab **12** is mounted in the mounting recess **42**A of the sliding door **40**A and abuts the bottom face of the mounting recess **42**A to provide an abutment-support effect to the pulling tab **12**.

According to the above-mentioned first embodiment of the handle device, with reference to FIG. **4**, in assembly, the outside handle **10** is separated from the inside handle **20**, the inner side of the connecting board **11** is mounted on and abuts the inner side of the sliding door **40**, and the pressing end **122** of the pulling tab **12** is mounted on and abuts the front edge of the sliding door **40**. The mats **14** are mounted between the sliding door **40**, the connecting board **11**, and the pressing end **122** of the pulling tab **12**. The bolt **22** is connected to the fixing hole **111** of the connecting board **11** via the through hole **41** of the sliding door **40**, the mounting block **211** is mounted in the through hole **41** of the sliding door **40**, and then the bolt **22** is connected to the threaded hole **212** to enable the inside handle **20** to connect with the outside handle **10** on the sliding door **40**. Alternatively, the bolt **22** also can be first connected to the threaded hole **212** of the mounting block **211**, and then the mounting block **211** is mounted in the through hole **41** of the sliding door **40** such that, by rotating the mounting block **211**, the blot **22** is connected to the fixing hole **111** of the connecting board **11** to connect the outside handle **10** with the inside handle **20** on the sliding door **40**. The assembling sequence of the handle device in accordance with the present invention is not limited.

In use, with reference to FIGS. **4** and **5**, when the sliding door **40** is moved relative to a wall **50** to close a passage formed between the wall **50** and the sliding door **40**, if a user stands at the outer side of the sliding door **40**, the user can push the outside handle **10** to move the sliding door **40** toward the wall **50** to open the passage. When the siding door **40** is moved toward the wall **50**, since the assembling mount **21** is mounted on the inner side of the sliding door **40** without extending out of the sliding door **40**, and this can enable the assembling mount **21** to be located in a gap between the sliding door **40** and the wall **50** without hitting the wall **50**. Then, the rear edge of the sliding door **40** can align with a rear edge of the wall **50** to enable the passage to be fully opened without interfering with the sliding door **40**, and this can provide a wider passage for the user to pass through. In addition, when the passage is closed and the user stands at the side of the wall **50**, the user can insert fingers into the recess **213** to push the assembling mount **21** as shown in FIG. **3**, so as to enable the sliding door **40** to move toward the wall **50** to open the passage easily and conveniently.

Furthermore, with reference to FIG. **4**, when the rear edge of the sliding door **40** aligns with the rear edge of the wall **50** to open the passage and the user stands at the side of the sliding door **40**, the user can close the passage of the wall **50** by putting hands into the hooking groove **13** to push the sliding door **40** with the outside handle **10** to close the passage of the wall **50**. When the user stands at the side of the wall **50**, the user's hands can reversely hook the pulling tab **12** without moving at the side of the sliding door **40** to move the sliding door **40** to move relative to the wall **50** to close the passage of the wall **50** and this is convenient in use.

Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and features of the invention, the disclosure is illustrative only Changes may be made in the details, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. A sliding-door assembly comprising:

a sliding door having a front edge, a rear edge that is opposite to the front edge, an inner surface that is connected between the front and rear edges, and an outer surface that is opposite to the inner surface and that is connected between the front and rear edges, the sliding door movable in a direction of either the front or rear edges;

an outside handle having:

a connecting board shaped as an elongated strip that extends in a first horizontal plane, and having an inner side that faces the outer surface of the sliding door, an outer side, a rear end and a front end; and

a pulling tab formed on and protruding perpendicularly from the front end of the connecting board, and having a pulling end formed on, protruding from and extending out of the outer side of the connecting board, and a pressing end, abutting the front edge of the sliding door, and formed with the pulling end of the pulling tab, formed on and protruding from the inner side of the connecting board, said pulling end and said pressing end being substantially aligned with each other in a second horizontal plane that is perpendicular to the first horizontal plane, front ends of said pulling end and said pressing end cooperatively defining an upright front side surface; and

an inside handle detachably connected to the outside handle and having;

an assembling mount having an inner side facing to the inner side of the connecting board and abutting against the inner surface of the sliding door, an outer side, and a recess formed in the outer side of the assembling mount, and

a mounting block formed on and protruding from the inner side of the assembling mount , extending through the sliding door, and connected to the connecting board to connect the outside handle with the inside handle;

wherein the outside handle is formed in a T shape by the connecting board and the pulling tab; and

wherein the pressing end of the pulling tab is adapted to abut against the front edge of the sliding door, thereby facilitating access of the pulling end to a user standing at a side of the sliding door opposite to the outside surface.

2. The sliding-door assembly as claimed in claim **1**, wherein

the connecting board has a fixing hole formed in the inner side of the connecting board near the rear end of the connecting board;

the mounting block has a center and a threaded hole formed in the center of the mounting block and aligning with the fixing hole of the connecting board; and

the inside handle has a bolt mounted in the threaded hole of the mounting block and the fixing hole of the connecting board to connect the outside handle with the inside handle.

3. The sliding-door assembly as claimed in claim **2**, wherein the mounting block is connected to the connecting board near the rear end of the connecting board and opposite to the pulling tab.

4. The sliding-door assembly as claimed in claim **1**, wherein the mounting block is connected to the connecting board near the rear end of the connecting board and opposite to the pulling tab.

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